FEBRUARY 1973, No. 2

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LA JOLLA,
ALIFORNIA

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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PREFACE

This publication, Fishing Information, appears monthly and contains 1) fishery advisory information, 2) a narrative description of pertinent surface temperature conditions, 3) a narrative description of subsurface temperature structure for parts of the North Pacific, 4) charts of winds and pressures for the eastern North Pacific, 5) charts of sea surface temperature for the North Pacific and eastern tropical Pacific, and 6) charts of subsurface temperature structure in the eastern North Pacific.

A supplement to Fishing Information appears at 15-day intervals throughout the year. This is a chart of sea surface temperature (contoured at 2°F (1°C) intervals) from Baja California to Vancouver Island out to about 135°W. Special bulletins are published in conjunction with the 15-day sea surface temperature charts which include short-term projections of albacore distribution and locations of productive fishing areas, information on oceanographic and atmospheric conditions, and other information as is appropriate during the albacore fishing season.

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La Jolla, California

Submitted for publication - March 15, 1973

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L. Eber (Figure 4), F. Miller (Figures 7, 8, and 9)
J. Renner (Figures 1, 2, 3, 5, and 6), J.F.T. Saur (Figure 10)

TECHNICAL EDITOR:

K. Raymond

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Sea Surface Temperature and Environmental Conditions

L. EBER AND F. MILLER

Northeastern Pacific

Seasonal cooling in the eastern North Pacific usually causes sea surface temperatures to decrease by varying amounts up to 2° F (1.1° C) between January and February. In 1973, cooling was slightly greater than normal in much of the region between 135° W and 155° W, south of latitude 50° N. The maximum temperature drop from January to February 1973, was about 3° F (1.7° C) at 35° N to 40° N in the vicinity of 150° W. Elsewhere, cooling occurred at or less than the normal rate and was in fact reversed in some near-shore areas of the Gulf of Alaska and along the Oregon and California coasts where temperatures rose slightly from January to February.

Deviations from the long-term mean continued to be positive off Baja California and southern California and changed from negative to positive in a narrow coastal zone from central California to Cape Flattery, Washington (Figure 5). Temperatures were below normal from offshore Vancouver Island southward in the vicinity of 130° W. The extensive warm temperature anomaly west of longitude 140° W, which had persisted since October 1972, appeared to shift northward of 40° N and diminish in intensity as a consequence of the differential cooling mentioned earlier. Sea surface temperature deviations run normal westward of 160° W remained mixed in sign with a slight tendency for decreased negative deviations and increased positive deviations.

Atmospheric conditions were characterized by a succession of low pressure systems in the 1st, 2nd and 4th weeks of the month which moved east-southeastward from the western Pacific to about 135° W and then deepened off the California and Oregon coasts. The presence of these Lows is reflected in below-normal average pressure for February 1973 off the U. S. west coast, south of 45° N (Figures 1 and 2). Southerly winds to the east of the Low centers contributed to the northward spread of positive sea surface temperature deviations along the U. S. west coast. Atmospheric pressure was above normal in the region to the north and northeast of Hawaii and southward of 45° N. The net result of these abnormal conditions in the pressure field was relatively strong northerly wind components in the area around 35° N between 145° W and 155° W where maximum cooling of surface water occurred. Average winds for the month in this area had values up to 25 knots and contributed to excess heat loss at the surface through increased evaporation and conduction.

Eastern Tropical Pacific

The overall sea surface temperature patterns in February 1973 (Figure 7) do not appear much different from the January 1973 patterns in the eastern tropical Pacific. However, there are some significant differences which show up both in the isotherms and the temperature anomalies (Figure 8). This is the first month since November that the positive temperature anomalies off the coast of South America have decreased 2° F (1.1° C) or more. In fact, small negative anomalies appear off the coast from southern Peru to the Galapagos Islands. The large positive anomaly centered near 5° S near the coast has decreased by 2°-3° F (1.1°-1.7° C) since January. From 85° W to 120° W in the southern Hemisphere and along 5° S there has been a small temperature increase. This is a typical change from January to February south of the equator.

The surface pressure gradient off South America has remained above normal throughout February. As in January, this suggests continuing re-establishment of the steady southeast trades. The appearance of a slight negative temperature anomaly south of Lima, Peru, which replaces a positive anomaly present in January for the same area, further supports the evidence that the wind stress along the coast is inducing enough upwelling to effect a gradual return of surface temperatures to normal in the Peru Current.

Along the equator from 120° W to 140° W sea surface temperatures fell considerably because of the persistent, strong northeast trades which extended across the equator most of February. To the west of 140° W a warm anomaly persists with little change from the previous month.

In the Gulf of Panama, off Central America and to the south of Baja California, the strong northerly surface winds intensified vertical mixing and negative anomalies replaced positive ones in these areas. Also in the Gulf of Panama, upwelling became a dominant feature in February whereas in previous months upwelling was either weak or absent.

Subsurface Temperature Structure in the Northeast Pacific Ocean

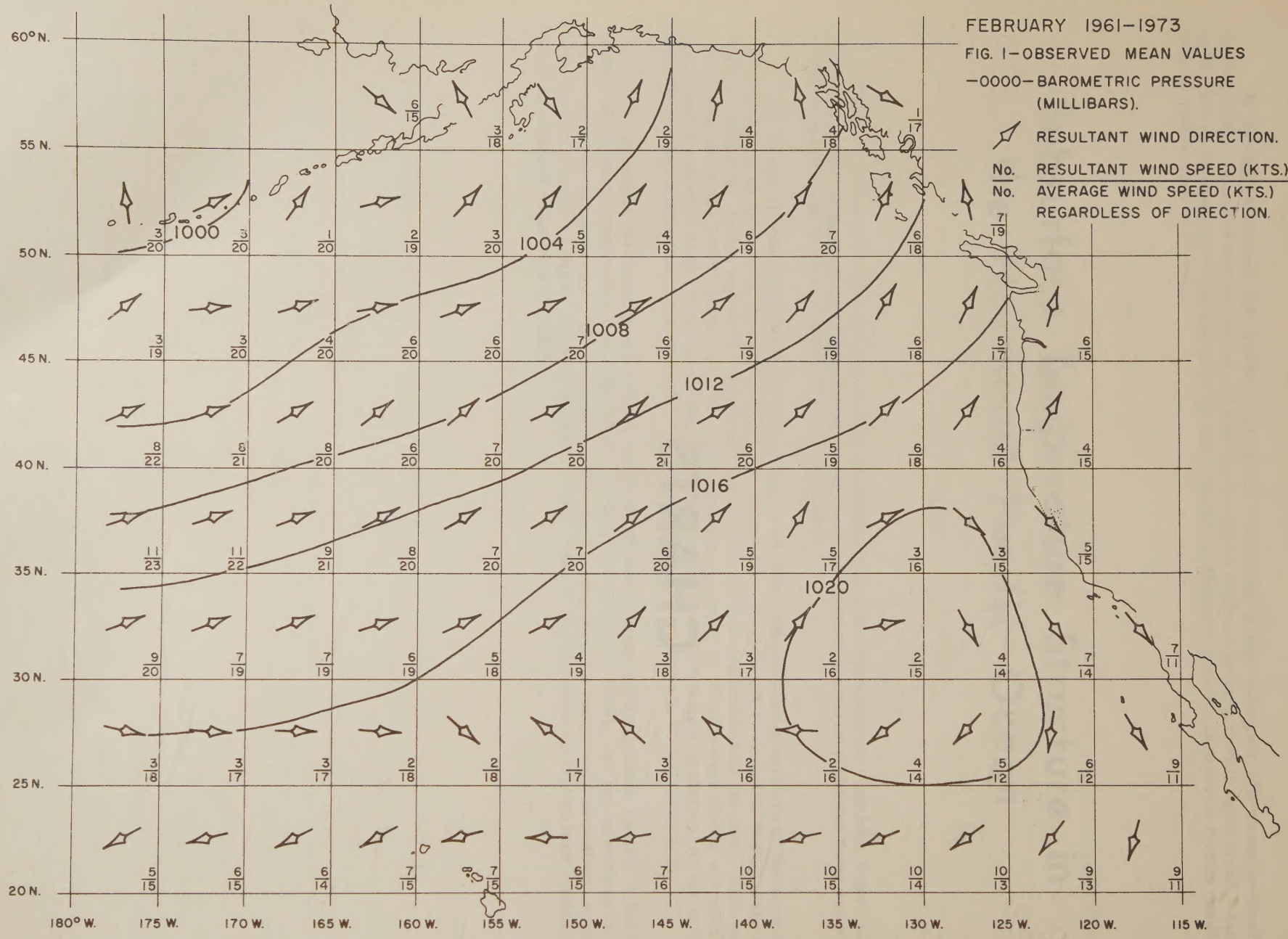
J. F. T. SAUR

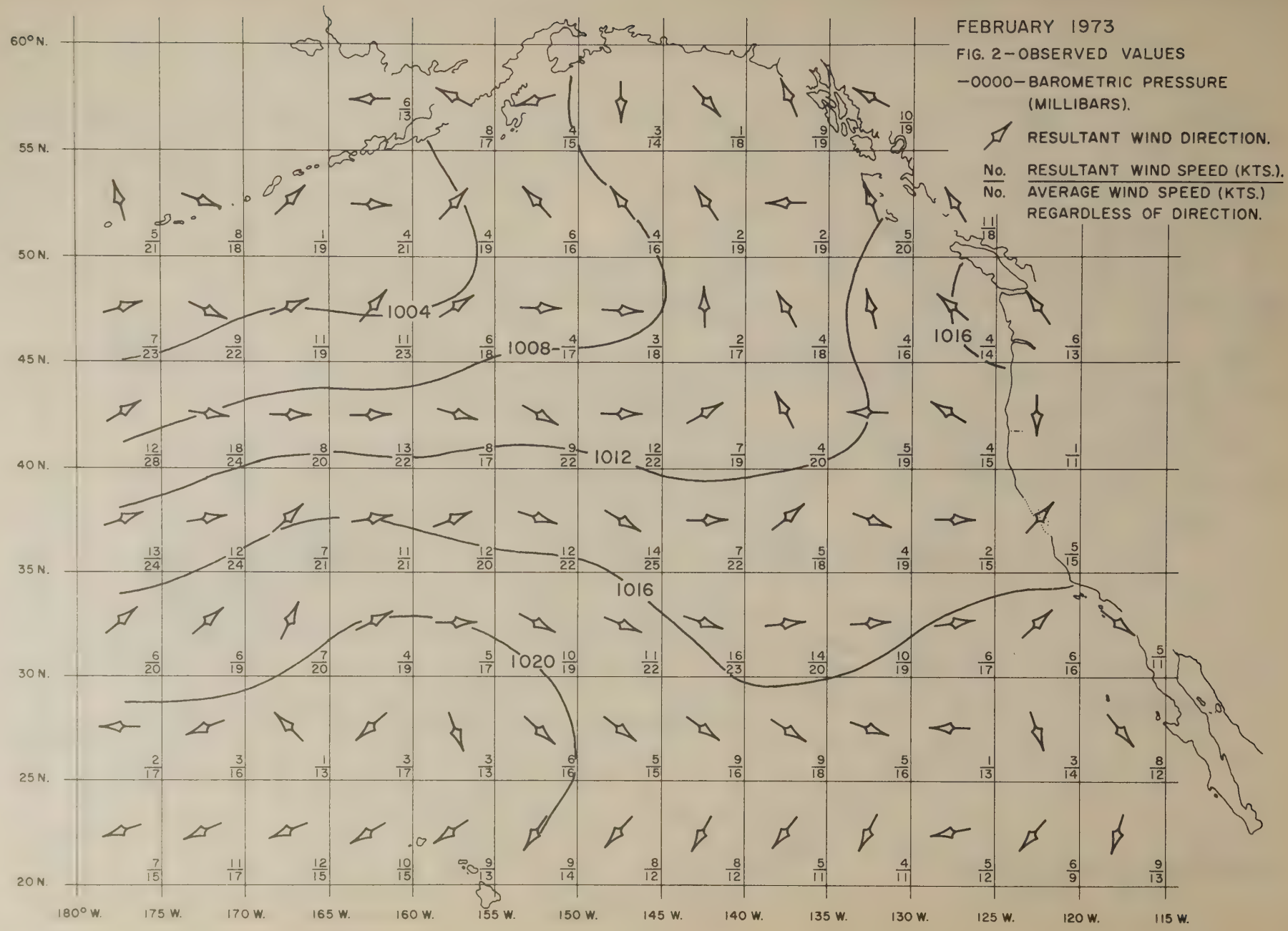
The section of sub-surface temperature observations between San Francisco and Honolulu, Figure 10, was made by the SS Hawaiian Enterprise in early February. Because of equipment problems there are insufficient observations to prepare a section for late February.

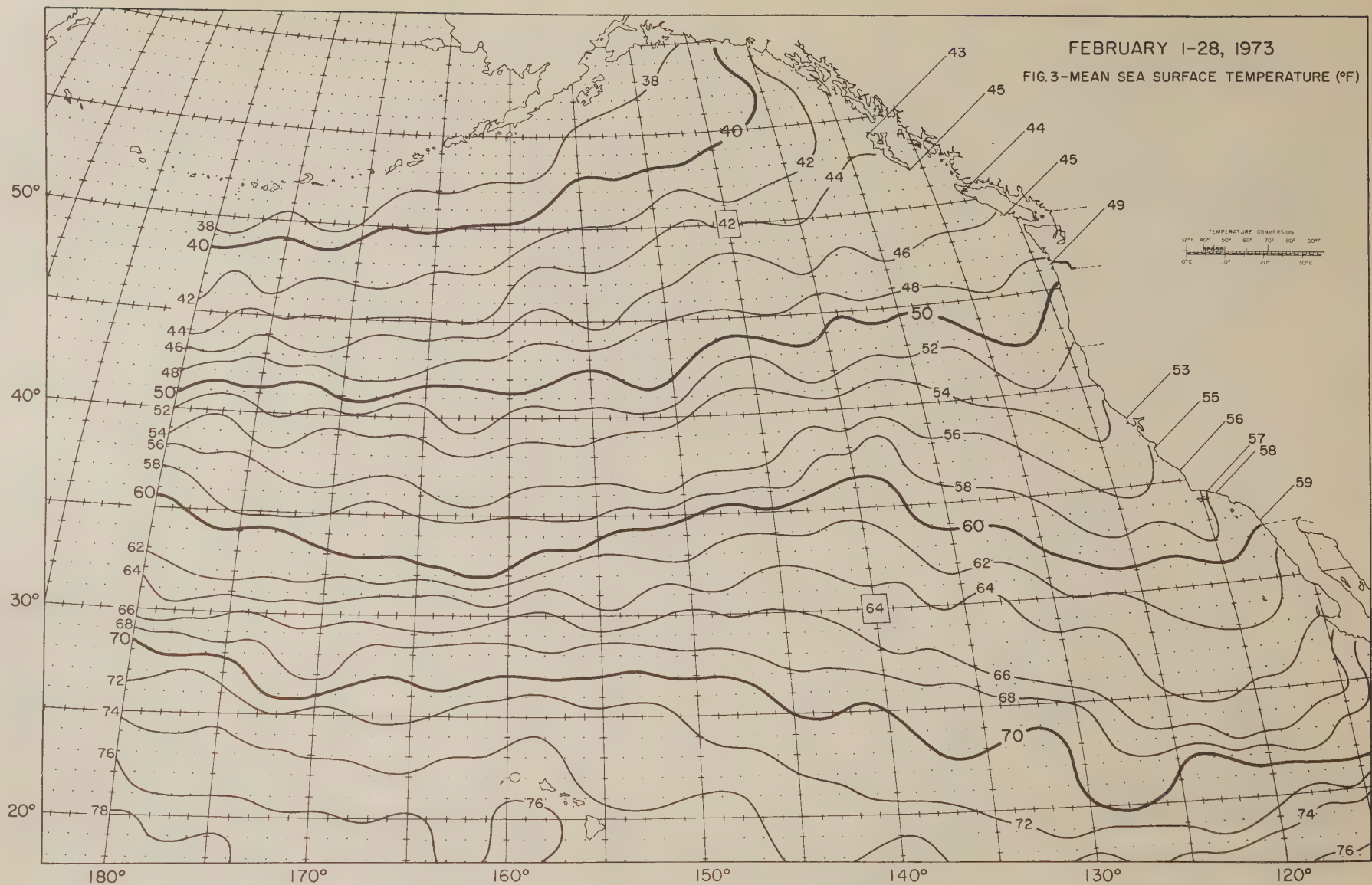
The effects of continued wintertime cooling appear as both a decrease in temperature of the surface mixed layer and an increase in the depth of the layer, except from the coast out to about 139° W (700 nautical miles to station 6). In this region the temperature and layer depth have remained about the same. Between 140° W (station 7) and 150° W (station 15) the mixed layer has deepened by 30-40 meters during a 1-month period and is generally deeper than 100 meters, which is not uncommon for this area in winter. At the same time the average temperature from the surface to 100 meters has decreased by 1.0°-1.5° C (2°-3° F).

The strongest horizontal temperature gradient in the surface layer occurs between stations 4 and 5, where the surface temperature increases westward from 14°-16° C (57°-61° F), and the subsurface isotherms slope sharply downward. This feature has persisted at this location since early December. Along with the rise in surface salinity, it indicates that the outer edge of the California Current is near station 5, about 600 nautical miles from the coast.

CHARTS


FEBRUARY 1961–1973
FIG. 1–OBSERVED MEAN VALUES
–0000– BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. RESULTANT WIND SPEED (KTS.).
No. AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
1000
1004
1008
1012
1016
1020
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.


FEBRUARY 1973
FIG. 2—OBSERVED VALUES
—0000— BAROMETRIC PRESSURE (MILLIBARS).
RESULTANT WIND DIRECTION.
No. / No. RESULTANT WIND SPEED (KTS.). / AVERAGE WIND SPEED (KTS.) REGARDLESS OF DIRECTION.
60° N.
55 N.
50 N.
45 N.
40 N.
35 N.
30 N.
25 N.
20 N.
180° W.
175 W.
170 W.
165 W.
160 W.
155 W.
150 W.
145 W.
140 W.
135 W.
130 W.
125 W.
120 W.
115 W.
1004
1008
1012
1016
1020


FEBRUARY 1-28, 1973
FIG. 3-MEAN SEA SURFACE TEMPERATURE (°F)
TEMPERATURE CONVERSION
32°F 40° 50° 60° 70° 80° 90°F
0°C 10° 20° 30°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
38
40
42
44
46
48
50
52
54
56
58
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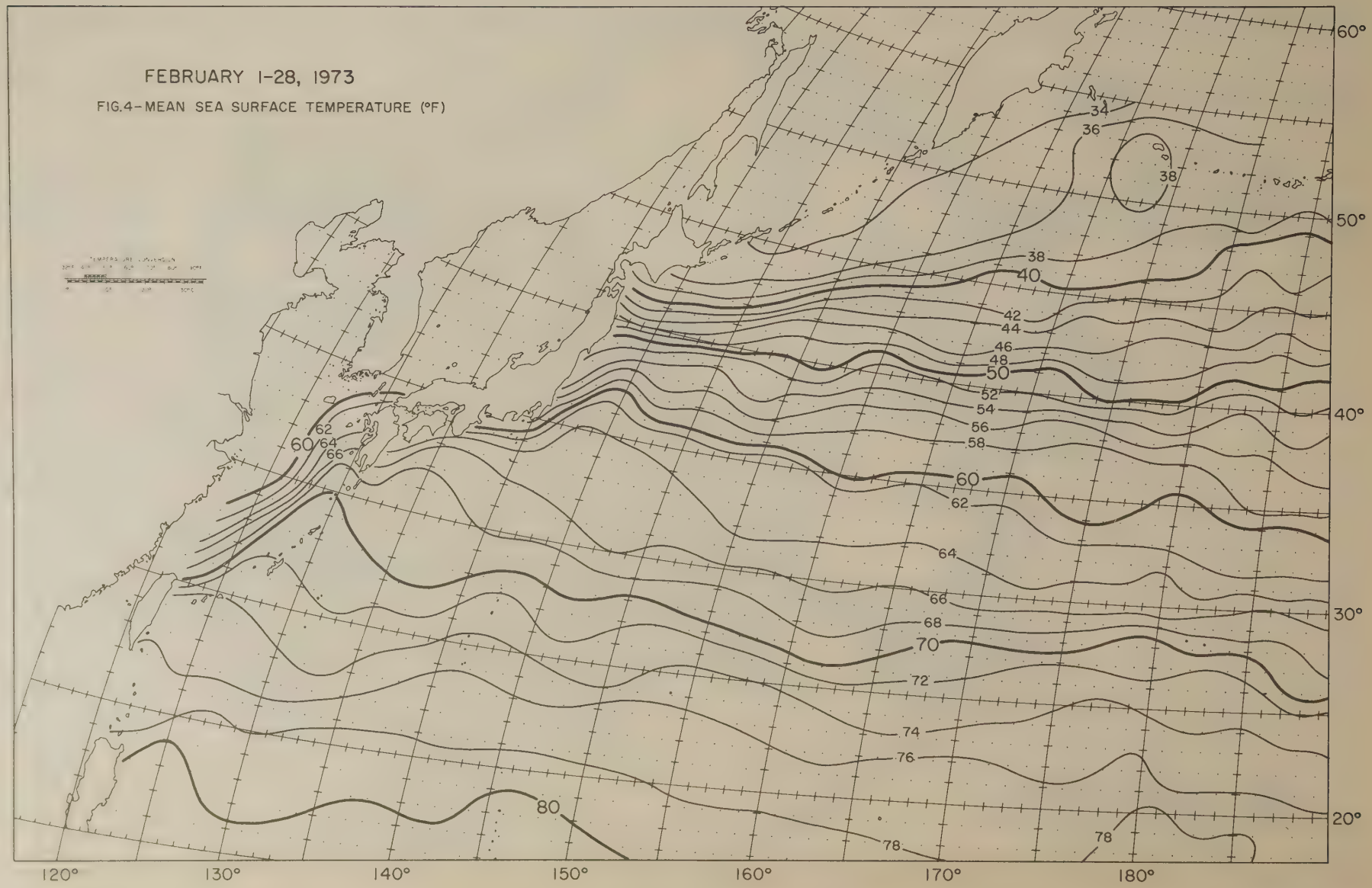
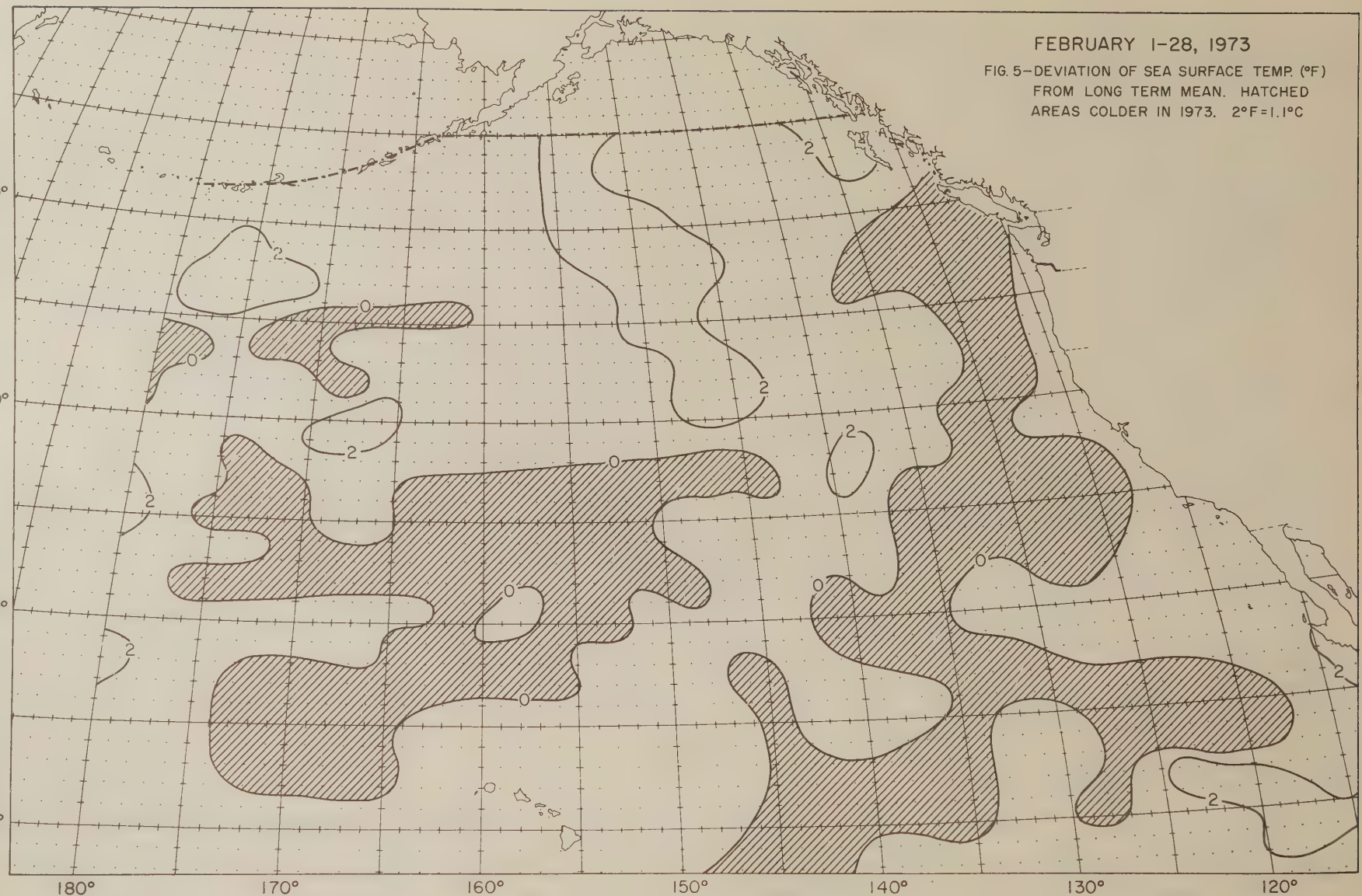

FEBRUARY 1-28, 1973
FIG.4-MEAN SEA SURFACE TEMPERATURE (°F)
34
36
38
38
40
42
44
46
48
50
52
54
56
58
60
62
64
66
68
70
72
74
76
78
78
80
60
62
64
66
60°
50°
40°
30°
20°
120°
130°
140°
150°
160°
170°
180°


FEBRUARY 1-28, 1973
FIG. 5-DEVIATION OF SEA SURFACE TEMP. (°F) FROM LONG TERM MEAN. HATCHED AREAS COLDER IN 1973. 2°F=1.1°C
50°
40°
30°
20°
180°
170°
160°
150°
140°
130°
120°
2
0

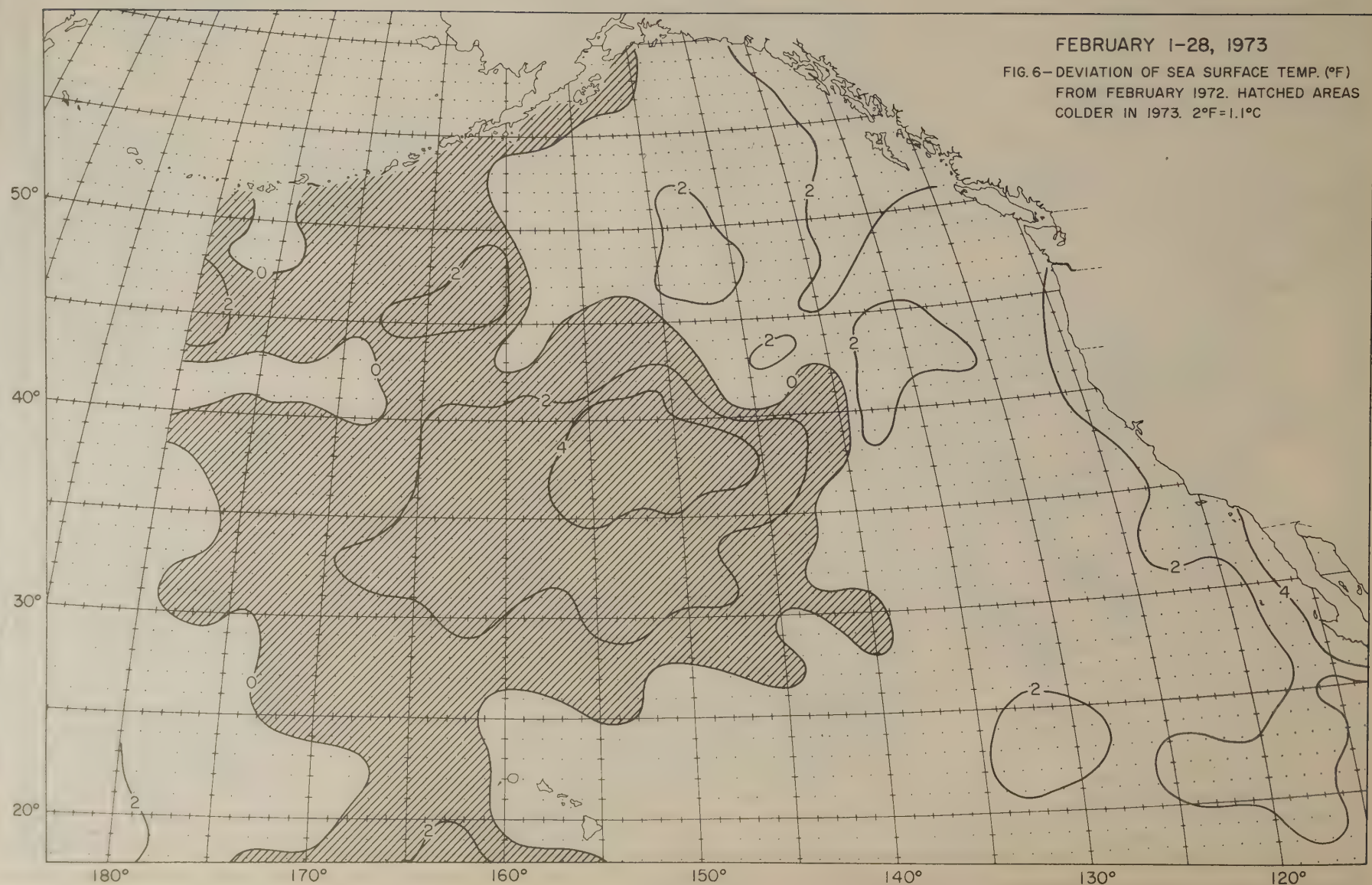
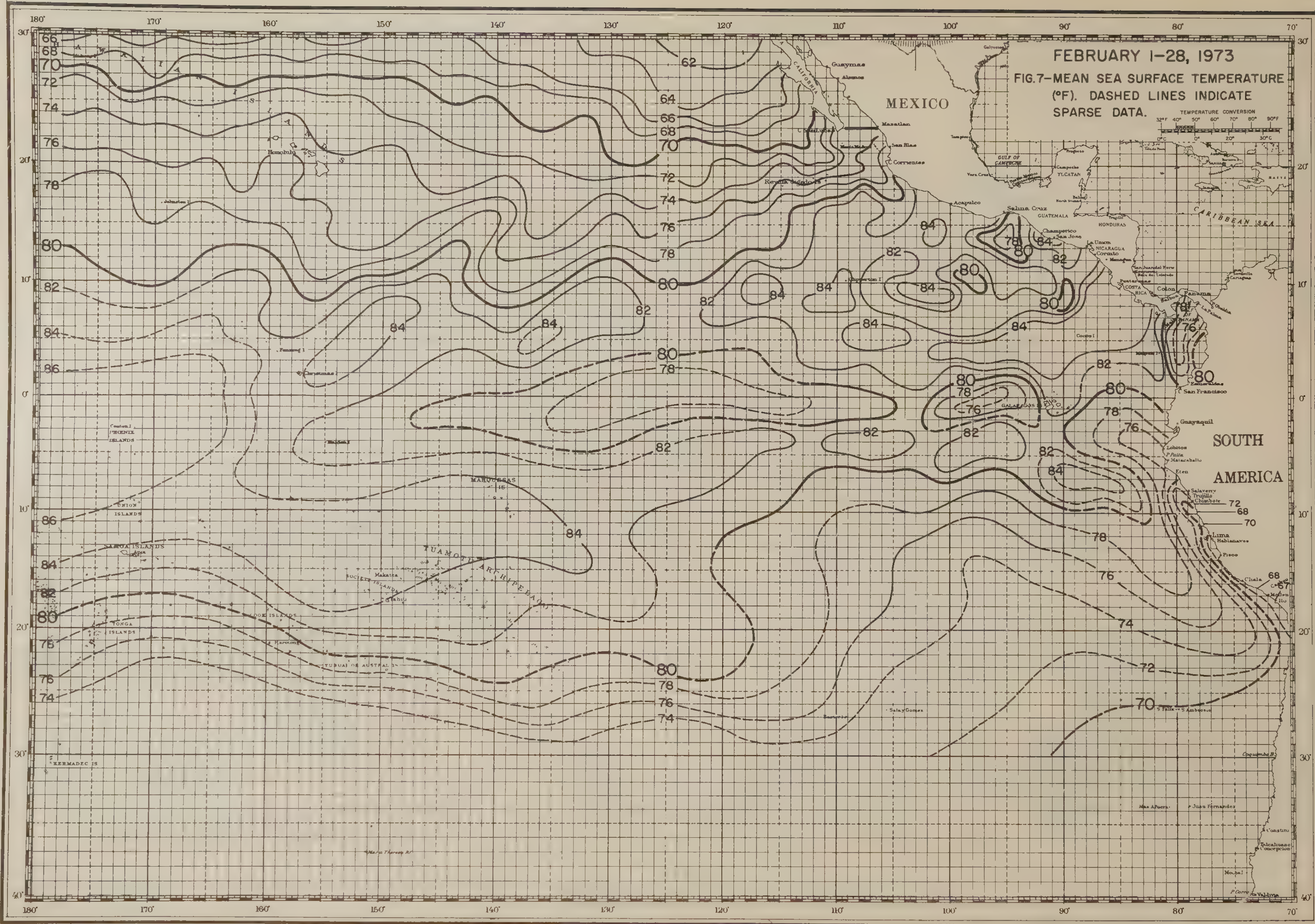
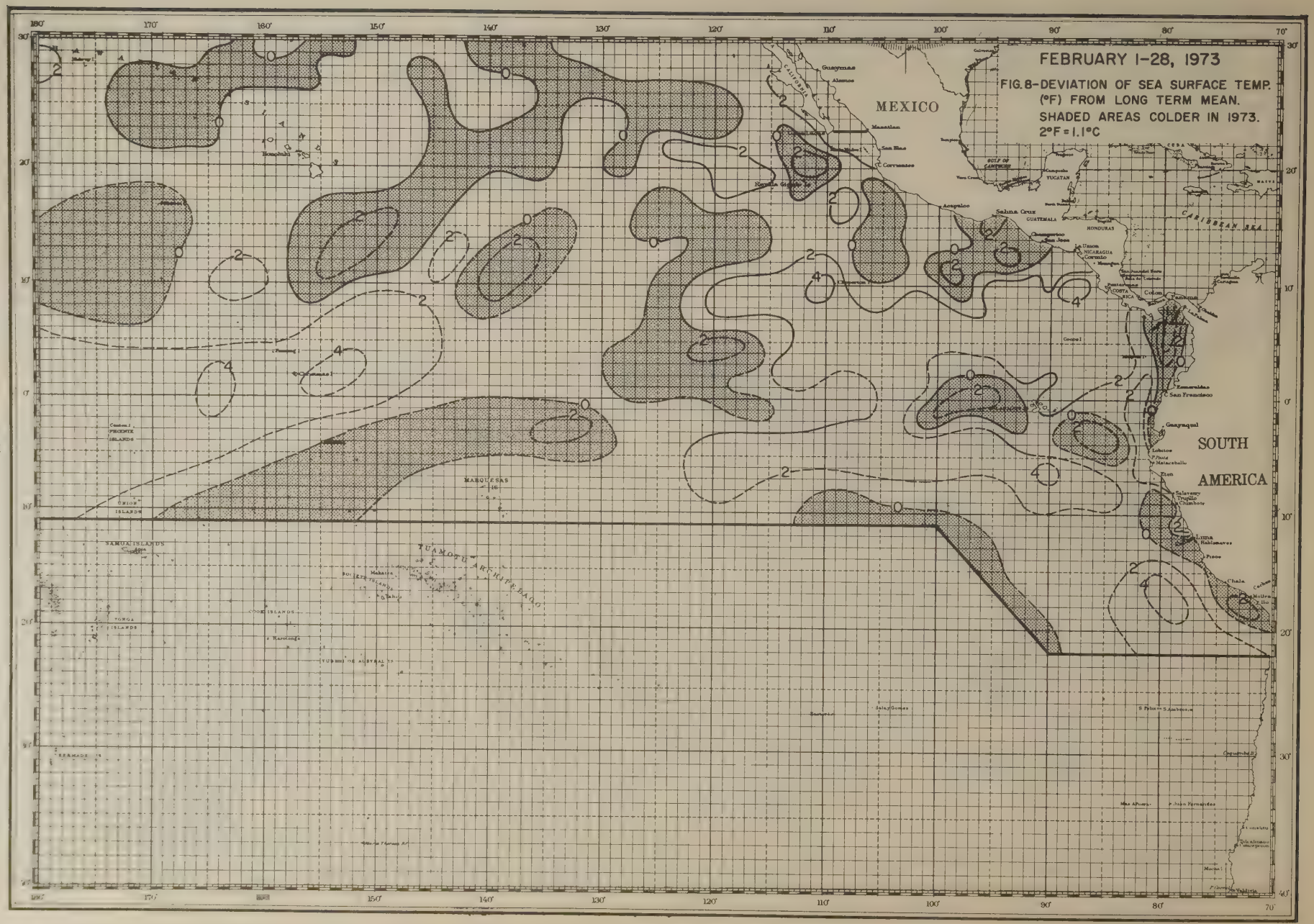


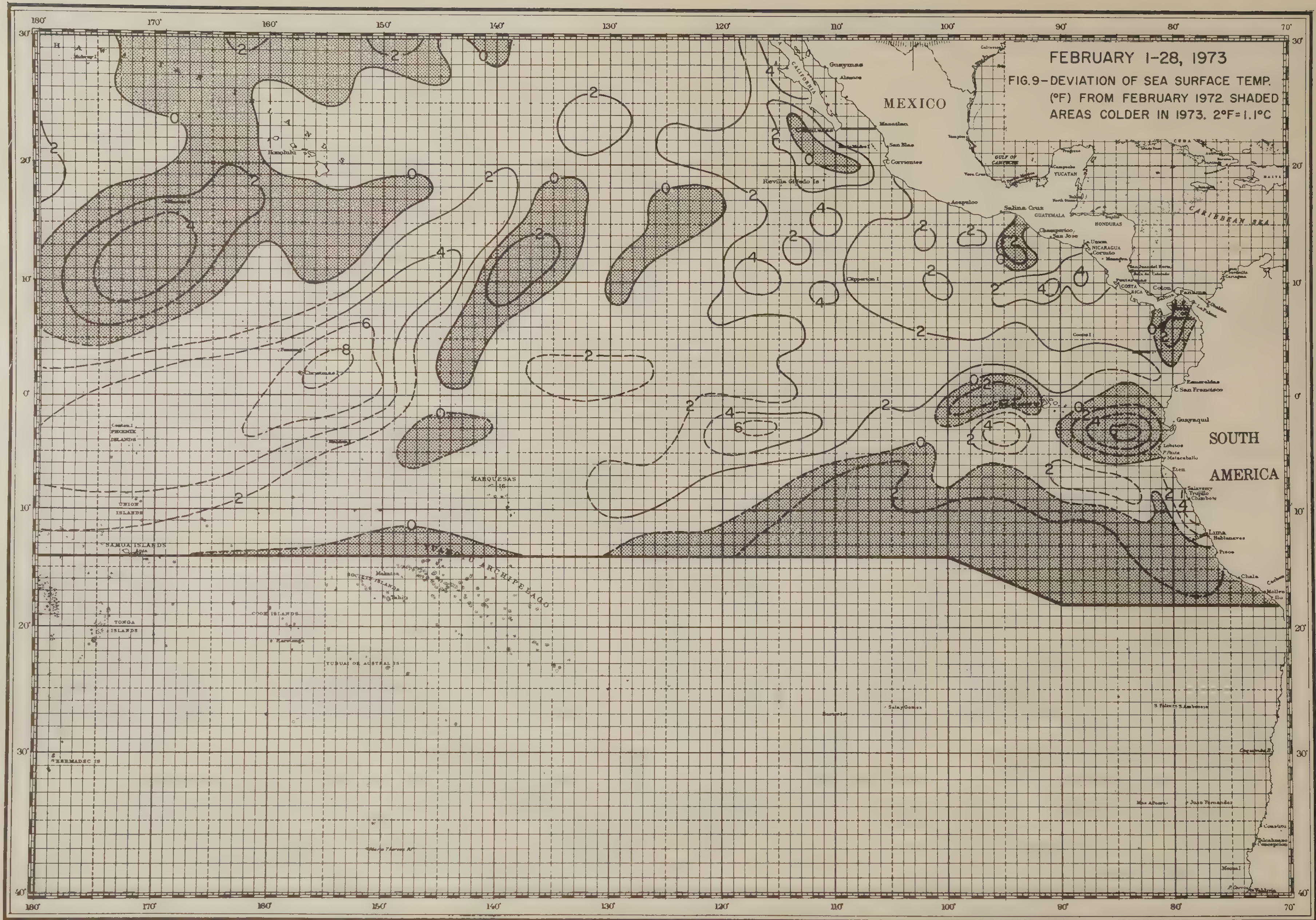
FIG. 6—DEVIATION OF SEA SURFACE TEMP. (°F) FROM FEBRUARY 1972. HATCHED AREAS COLDER IN 1973. 2°F=1.1°C



FEBRUARY 1–28, 1973

FIG. 7–MEAN SEA SURFACE TEMPERATURE (°F). DASHED LINES INDICATE SPARSE DATA.


FEBRUARY 1-28, 1973
FIG. 8-DEVIATION OF SEA SURFACE TEMP. (°F) FROM LONG TERM MEAN. SHADED AREAS COLDER IN 1973. 2°F = 1.1°C
MEXICO
SOUTH AMERICA
CARIBBEAN SEA
GULF OF CAMPECHE
YUCATAN
GUATEMALA
HONDURAS
NICARAGUA
COSTA RICA
Panama
Colon
Guayaquil
Lima
Chala
Salina Cruz
Acapulco
Manzanillo
San Francisco
Honolulu
MARQUESAS
TUAMOTU ARCHIPELAGO
SAMOA ISLANDS
COOK ISLANDS
TONGA ISLANDS
PHOENIX ISLANDS
UNION ISLANDS
TUBUAI OR AUSTRALIA IS
Salay Gomez
Juan Fernandez
Valdivia

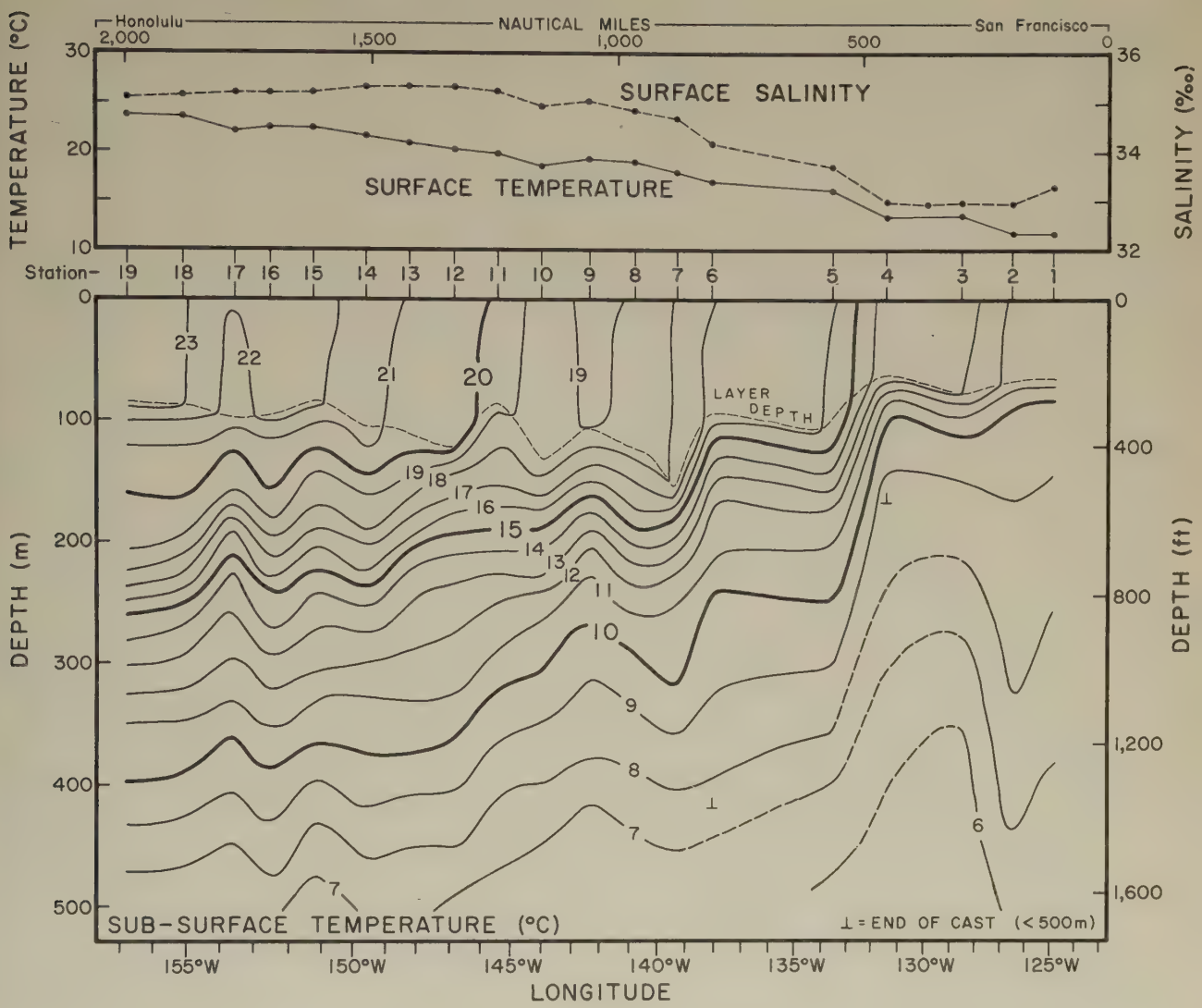


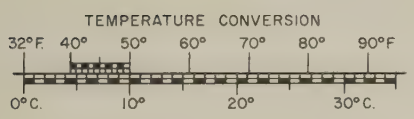
FEBRUARY 1-28, 1973

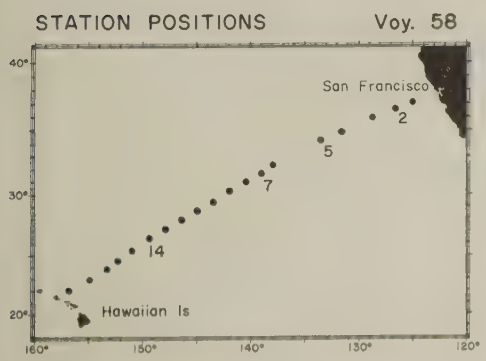
FIG. 9-DEVIATION OF SEA SURFACE TEMP. (°F) FROM FEBRUARY 1972. SHADED AREAS COLDER IN 1973. 2°F=1.1°C

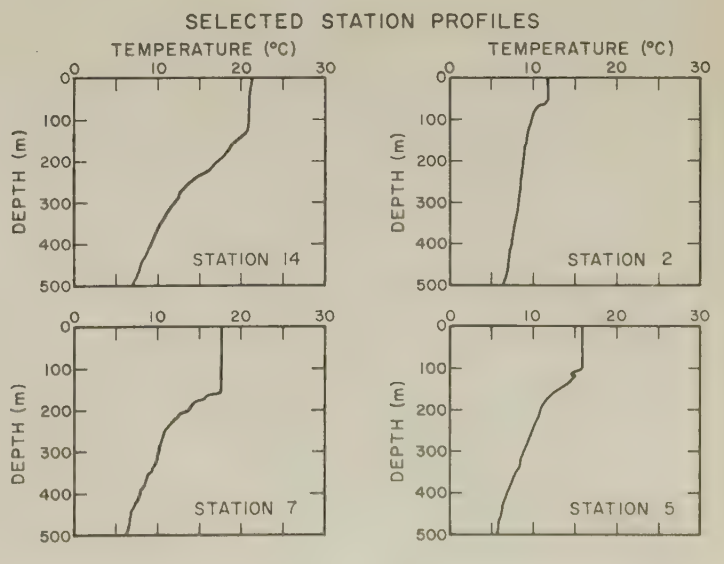
FEBRUARY 3-7, 1973
SS HAWAIIAN ENTERPRISE, Voyage 58

FIGURE 10.









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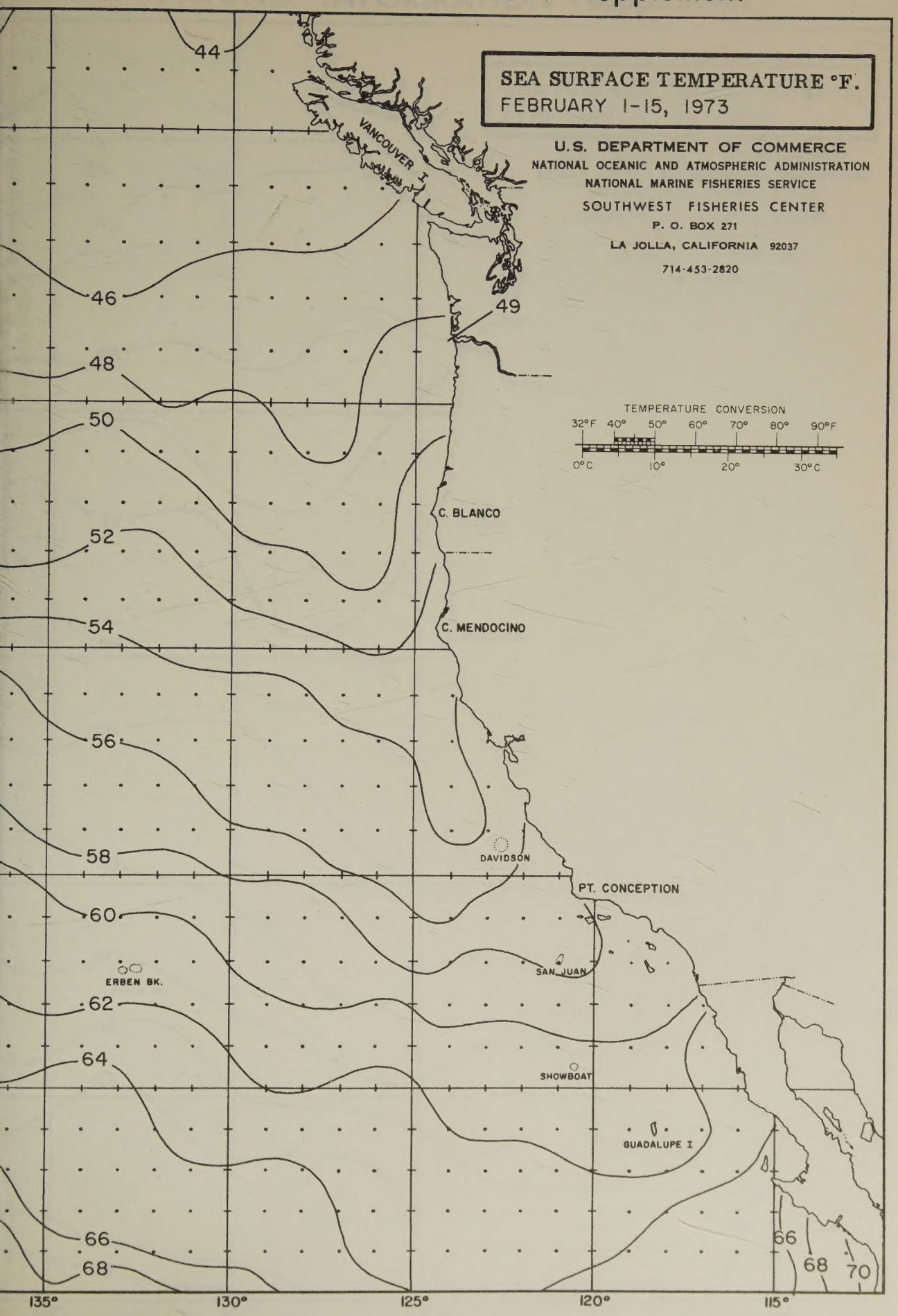
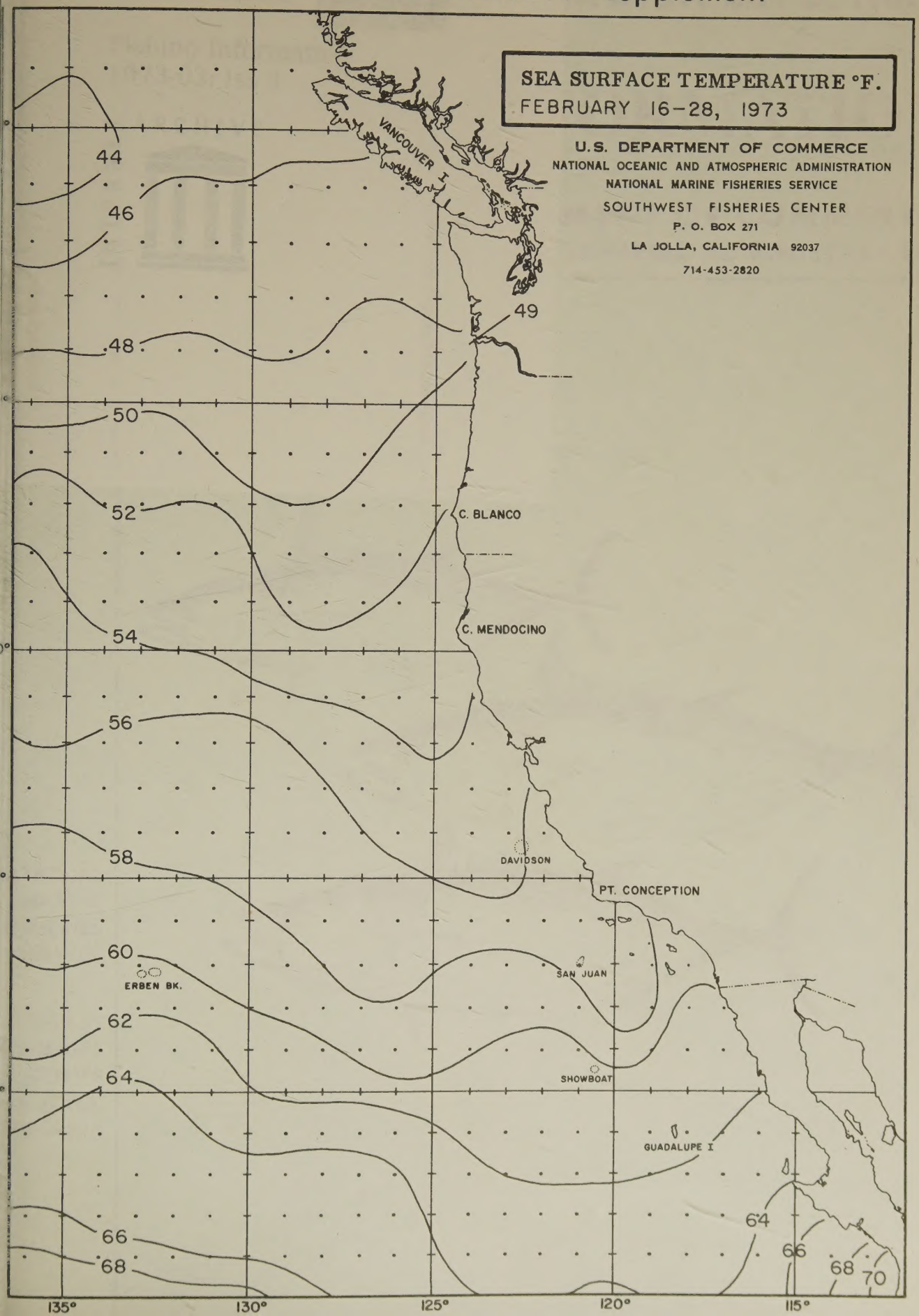
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